

WHAT IS CLAIMED IS:

1. A method of modulating a carrier with digital information having a series of datums represented in a plurality of symbols, said method comprising:
 - a) selecting a first number of half-periods of a first phase distinguished carrier signal for representing a corresponding symbol of a first one of said datums;
 - b) selecting a second number of half-periods of a second phase distinguished carrier signal for representing a corresponding symbol of the datum following said first datum;
 - c) determining at least one matching carrier signal having a third number of half-periods of a format to conform to a transition of said first phase distinguished carrier signal to said second phase distinguished carrier signal; and
 - d) sequentially arranging said first number of half-periods of a first phase distinguished carrier signal, said third number of half-periods of said matching carrier signal and said second number of half-periods of said second phase distinguished carrier signal.
2. A method as defined in claim 1 wherein said first number of half-periods is equal to said second number of half-periods.
3. A method as defined in claim 2 wherein the ratio of said first number of half-periods to said third number of half-periods is compatible with a partial-cross-correlator demodulator that produces a plurality of partial-cross-correlation values for each said phase distinguished carrier signals, and said values being solely dependant on said phase distinguished carrier signals.
4. A method as defined in claim 3 wherein the ratio of said first number of half-periods to said third number of half-periods is 3.
5. A method as defined in claim 1 wherein said first number of half-periods is equal to said third number of half-periods.
6. A method as defined in claim 2 wherein said third number of half-periods is 1.
7. A method as defined in claim 1 wherein said at least one matching carrier signal is selected from a set including two carrier signals having antipodal phases.

8. A method as defined in claim 1 wherein said at least one matching carrier signal is selected from a set including linear combinations of sinusoidally modulated quadrature carrier signals.
9. A method as defined in claim 1 wherein at least one matching carrier signal is determined in response to additional digital information.
10. A method of demodulating a modulated carrier having long carrier signals interspersed between matching signals, said method comprising:
 - a) sampling the modulated carrier;
 - b) detecting said matching signals;
 - c) synchronizing a clock with said matching signals;
 - d) detecting the long carrier signals in the correct interval as determined by said clock; and
 - e) demodulating said long carrier signals.
11. A method of demodulating a modulated carrier having long carrier signals interspersed between matching signals, said method comprising:
 - a) sampling the modulated carrier;
 - b) partially cross-correlating said sampling results; and
 - c) synchronizing said sampling on the basis of a history of said cross-correlation results.
12. A method of transmitting digital information having a series of datums represented in a plurality of symbols between a pair of corresponding modulator and demodulator, said method comprising:
 - a) at said modulator:
 - i) selecting a first number of half-periods of a first phase distinguished carrier signal for representing a corresponding symbol of a first one of said datums;
 - ii) selecting a second number of half-periods of a second phase distinguished carrier signal for representing a corresponding symbol of the datum following said first datum;
 - iii) determining at least one matching carrier signal having a third number of half-periods of a format to conform to a transition of said first phase distinguished carrier signal to said second phase distinguished carrier signal;

- iv) sequentially arranging said first number of half-periods of a first phase distinguished carrier signal, said third number of half-periods of said matching carrier signal and said second number of half-periods of said second phase distinguished carrier signal;
 - b) transmitting said modulated carrier from said modulator to a demodulator; and
 - c) at said demodulator:
 - i) sampling the modulated carrier;
 - ii) detecting said matching signals;
 - iii) synchronizing a clock with said matching signals;
 - iv) detecting the long carrier signals in the correct interval as determined by said clock;
 - v) demodulating said long carrier signals.
13. A method of transmitting digital information having a series of datums represented in a plurality of symbols between a pair of corresponding modulator and demodulator, said method comprising:
- a) at said modulator:
 - i) selecting a first number of half-periods of a first phase distinguished carrier signal for representing a corresponding symbol of a first one of said datums;
 - ii) selecting said first number of half-periods of a second phase distinguished carrier signal for representing a corresponding symbol of the datum following said first datum;
 - iii) determining at least one matching carrier signal having a second number of half-periods of a format to conform to a transition of said first phase distinguished carrier signal to said second phase distinguished carrier signal, wherein the ratio of said first number of half-periods to said second number of half-periods is compatible with a partial-cross-correlator demodulator that produces a plurality of partial-cross-correlation values for each said phase distinguished carrier signals, and said values being solely dependant on said phase distinguished carrier signals;
 - iv) sequentially arranging said first number of half-periods of a first phase distinguished carrier signal, said third number of half-periods of said matching

- carrier signal and said second number of half-periods of said second phase distinguished carrier signal;
 - b) transmitting said modulated carrier from said modulator to a demodulator; and
 - c) at said demodulator:
 - i) sampling the modulated carrier;
 - ii) partially cross-correlating said sampling results;
 - iii) synchronizing said sampling on the basis of a history of said cross-correlation results.
14. A modulated carrier of digital information having a series of datums represented in a plurality of symbols, the modulated carrier comprising:
- a) a first number of half-periods of a first phase distinguished carrier signal representing a corresponding symbol of a first one of said datums;
 - b) a second number of half-periods of a matching carrier signal conforming to a transition of said first phase distinguished carrier signal to a second phase distinguished carrier signal; and
 - c) a third number of half-periods of said second phase distinguished carrier signal representing a corresponding symbol of a first one of said datums.
15. An apparatus for modulating a carrier signal with digital information having a plurality of datums represented in a plurality of symbols, said apparatus comprising:
- a) an input symbol port;
 - b) a carrier/matching clock port;
 - c) a synchronizing clock port;
 - d) a preceding symbol memory having an output, said preceding symbol memory being input coupled to said input symbol port and said carrier/matching clock port;
 - e) a matching signal lookup having an output, said matching signal lookup being input coupled to said input symbol port, said preceding symbol memory output and said synchronizing clock port;
 - f) a carrier signal lookup having an output, said carrier signal lookup being input coupled to said input symbol port, said carrier/matching clock port and said synchronizing clock port;

- g) a first switch having an output, said first switch being control coupled to said carrier/matching clock port and input coupled to said matching signal lookup;
- h) a second switch having an output, said second switch being control coupled to said carrier/matching clock port and input coupled to said carrier signal lookup;
- and
- i) a modulator output input coupled to said first switch output and said second switch output;

wherein said plurality of datums are applied to said input symbol port and said modulator output provides said carrier signal.

16. An apparatus for demodulating a carrier signal with digital information having a plurality of datums represented in a plurality of symbols, said apparatus comprising:

- a) a signal input;
- b) a clock output;
- c) a data output;
- d) a synchronizer output coupled to said clock output;
- e) a switch input coupled to said signal input and control coupled to said synchronizer,
- f) a matching signal demodulator input coupled to said switch and output coupled to said synchronizer, and
- g) a carrier signal demodulator input coupled to said switch, control coupled to said synchronizer and output coupled to said data output;

wherein said carrier signal is applied to said signal input and said data output provides a plurality of datums.

17. A system for transmitting digital information having a series of datums represented in a plurality of symbols between a pair of corresponding modulator and demodulator, said system comprising:

- a) an apparatus for modulating a carrier signal with said digital information, said modulating apparatus comprising:
 - i) an input symbol port;
 - ii) a carrier/matching clock port;
 - iii) a synchronizing clock port;

- iv) a preceding symbol memory having an output, said preceding symbol memory being input coupled to said input symbol port and said carrier/matching clock port;
 - v) a matching signal lookup having an output, said matching signal lookup being input coupled to said input symbol port, said preceding symbol memory output and said synchronizing clock port;
 - vi) a carrier signal lookup having an output, said carrier signal lookup being input coupled to said input symbol port, said carrier/matching clock port and said synchronizing clock port;
 - vii) a first switch having an output, said first switch being control coupled to said carrier/matching clock port and input coupled to said matching signal lookup;
 - viii) a second switch having an output, said second switch being control coupled to said carrier/matching clock port and input coupled to said carrier signal lookup; and
 - ix) a modulator output input coupled to said first switch output and said second switch output, wherein said plurality of datums are applied to said input symbol port and said modulator output provides said carrier signal.
- b) an apparatus for demodulating said carrier signal, said apparatus comprising:
- i) a signal input;
 - ii) a clock output;
 - iii) a data output;
 - iv) a synchronizer output coupled to said clock output;
 - v) a switch input coupled to said signal input and control coupled to said synchronizer,
 - vi) a matching signal demodulator input coupled to said switch and output coupled to said synchronizer, and
 - vii) a carrier signal demodulator input coupled to said switch, control coupled to said synchronizer and output coupled to said data output, wherein said carrier signal is applied to said signal input and said data output provides a plurality of datums;

c) a transmission means for transmitting said modulated carrier from said modulating apparatus to said demodulating apparatus.